

MCF 3M Quadratic Opener

A firecracker is fired from the ground. The height of the firecracker at a given time is modeled by the function $h(t) = -5t^2 + 50t$ where $h(t)$ is the height in metres and t is the time in seconds. When will the firecracker reach 45m?

Jun 8-7:33 AM

MCF 3M Quadratic Opener

A firecracker is fired from the ground. The height of the firecracker at a given time is modeled by the function $h(t) = -5t^2 + 50t$ where $h(t)$ is the height in metres and t is the time in seconds. When will the firecracker reach 45m?

$$\begin{aligned}
 h(t) &= -5t^2 + 50t \\
 45 &= -5t^2 + 50t \\
 0 &= -5t^2 + 50t - 45 \\
 0 &= -5(t^2 - 10t + 9) \\
 0 &= -5(t^2 - 9t - 1t + 9) \\
 0 &= -5[t(t-9) - 1(t-9)] \\
 0 &= -5(t-9)(t-1)
 \end{aligned}$$

A	M
10	-9
	-1 -9

\therefore The firecracker reaches 45m at 1 and 9 sec.

Jun 8-7:33 AM

Formulas

① SOH CAH TOA L
pythag

② sin } cosine law non right Δ s

sin law \rightarrow matching pair (side/angle)

cosine law \rightarrow $a^2 = b^2 + c^2 - 2bc \cos \angle A$

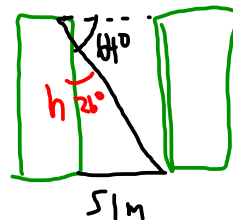
no matching pair

- enclosed angle & 2 sides
- all 3 sides

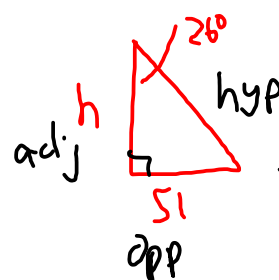
Jun 8-10:07 AM

p273 q 14
p281 q7
p290 q 13
p309 q 5

q14



51m

SOH CAH TOA

$$\tan 26^\circ = \frac{51}{h}$$

$$h = \frac{51}{\tan 26^\circ}$$

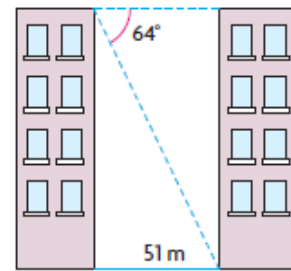
$$h = \frac{51}{0.4877}$$

$$h = 104.6 \text{ m}$$

Assign q 1-8 p316

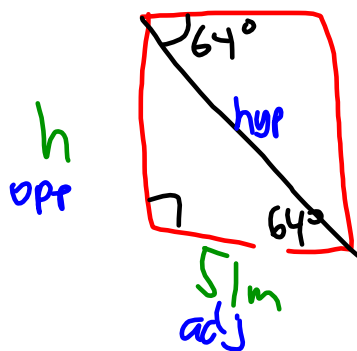
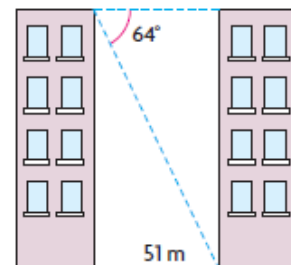
Jun 8-7:38 AM

14. Ainsley's and Caleb's apartment buildings are exactly the same height. Ainsley measures the distance between the buildings as 51 m and observes that the angle of depression from the roof of her building to the bottom of Caleb's is about 64° . How tall, to the nearest metre, is each building?
15. To use an extension ladder safely, the base must be 1 m out from the wall for every 2 m of vertical height.
- What is the maximum angle of elevation, to the nearest degree, to the top of the ladder?
 - If the ladder is extended to 4.72 m in length, how high can it safely



Jan 16-9:55 AM

14. Ainsley's and Caleb's apartment buildings are exactly the same height. Ainsley measures the distance between the buildings as 51 m and observes that the angle of depression from the roof of her building to the bottom of Caleb's is about 64° . How tall, to the nearest metre, is each building?
15. To use an extension ladder safely, the base must be 1 m out from the wall for every 2 m of vertical height.
- What is the maximum angle of elevation, to the nearest degree, to the top of the ladder?
 - If the ladder is extended to 4.72 m in length, how high can it safely



SOH CAH TOA

$$\tan 64^\circ = \frac{h}{51}$$

$$51 (\tan 64^\circ) = h$$

$$51 (2.0503) = h$$

$$104.6 \text{ m} = h$$

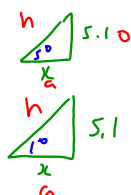
Jan 16-9:55 AM

7. Jordan is standing on a bridge over the Welland Canal. His eyes are 5.1 m above the surface of the water. He sees a cargo ship heading straight toward him. From his position, the bow appears at an angle of depression of 5° and the stern appears at an angle of depression of 1° . For each question, round your answer to the nearest tenth of a metre.
- What is the straight-line distance from the bow to Jordan?
 - What is the straight-line distance from the stern to Jordan?
 - What is the length of the ship from bow to stern?



Jan 16-10:07 AM

7. Jordan is standing on a bridge over the Welland Canal. His eyes are 5.1 m above the surface of the water. He sees a cargo ship heading straight toward him. From his position, the bow appears at an angle of depression of 5° and the stern appears at an angle of depression of 1° . For each question, round your answer to the nearest tenth of a metre.
- What is the straight-line distance from the bow to Jordan?
 - What is the straight-line distance from the stern to Jordan?
 - What is the length of the ship from bow to stern?



So it's LA + TVA

$$\tan 5^\circ = \frac{5.1}{a}$$

$$a = \frac{5.1}{\tan 5^\circ}$$

$$a = \frac{5.1}{0.0892}$$

$$= 57.2$$

$$\tan 1^\circ = \frac{5.1}{a}$$

$$a = \frac{5.1}{\tan 1^\circ}$$

$$a = \frac{5.1}{0.0174}$$

$$= 293.1$$

The length of the ship is 235.9 m. $(293.1 - 57.2)$

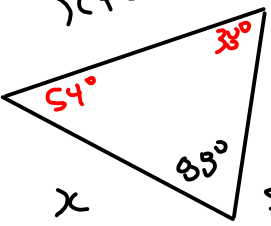
Jan 16-10:07 AM

13. Two angles in a triangle measure 54° and 38° . The longest side of the triangle is 24 cm longer than the shortest side. Calculate the length, to the nearest centimetre, of all three sides.

Jan 16-10:25 AM

13. Two angles in a triangle measure 54° and 38° . The longest side of the triangle is 24 cm longer than the shortest side. Calculate the length, to the nearest centimetre, of all three sides.

62.6
 $x + 24$
 38.6
 x



$$\frac{\sin 38^\circ}{x} = \frac{\sin 54^\circ}{x + 24}$$

$$\sin 38^\circ (x + 24) = \sin 54^\circ (x)$$

$$(0.6156)(x + 24) = 0.9993x$$

$$0.6156x + 14.8 = 0.9993x$$

$$14.8 = 0.9993x - 0.6156x$$

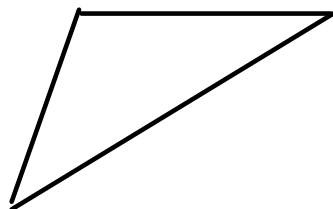
$$14.8 = 0.3837x$$

$$\underline{0.3837} \quad \underline{0.3837}$$

$$38.6 = x$$

Jan 16-10:25 AM

5. To get around an obstacle, a local electrical utility must lay two sections of underground cable that are 371.0 m and 440.0 m long. The two sections meet at an angle of 85° . How much extra cable is necessary due to the obstacle? Round your answer to the nearest tenth of a metre.

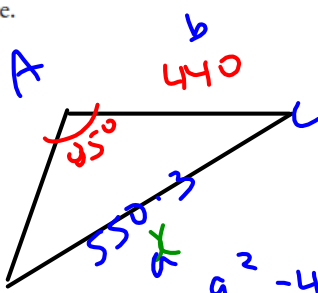
A 

Jan 16-10:36 AM

5. To get around an obstacle, a local electrical utility must lay two sections of underground cable that are 371.0 m and 440.0 m long. The two sections meet at an angle of 85° . How much extra cable is necessary due to the obstacle? Round your answer to the nearest tenth of a metre.

A 

$\angle A = 85^\circ$
 $a = ?$
 $b = 440$
 $c = 371$



$$a^2 = b^2 + c^2 - 2bc \cos \angle A$$

$$a^2 = 440^2 + 371^2 - 2(440)(371) \cos 85^\circ$$

$$a^2 = 193600 + 137641 - 326480 (0.0871)$$

$$a^2 = 331241 - 28484.6$$

$$a^2 = 302756.4$$

$$a = 550.3$$

$$(371 + 440) - 550.3 = 261 \text{ m extra}$$

Jan 16-10:36 AM

p273 q 14

p281 q7

p290 q 13

p309 q 5

Assign q 1-8 p316

Jun 8-7:38 AM

$$V = 2\pi r^3$$

$$\frac{1200 \text{ cm}^3}{2\pi} = \frac{2\pi r^3}{2\pi}$$

$$\frac{1200}{6.28} = r^3$$

$$\sqrt[3]{191.09} = r^3$$

$$5.75 = r$$

$$SA = 6\pi r^2$$

$$SA = 6\pi (5.75)^2$$

$$SA = 6(3.14)(33.06)$$

$$SA = 623.16 \text{ cm}^2$$

$$623.16 \times 0.35 = \$218.11$$

Jun 8-10:44 AM